REMARKS/ARGUMENTS

Claims 1-7, 9-26 and 28-40 were previously pending in the application. In the Office action mailed June 18, 2003, claims 1-7, 9-26 and 28-40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,140,228 (Shan et al.) in view of U.S. Patent No. 6,204,175 (Lai et al.). Applicant thanks the Examiner for attention to the application.

Claims 1, 21, and 40 are now substantively amended. Claims 15, 16, 34 and 35 are amended to correct typographical errors. Claims 4, 5, 6, and 24 are cancelled.

As an initial matter, the Office action in paragraph 3 indicates that the claim rejections under 35 U.S.C. § 103(a) are in view of Shan et al. and U.S. Publication No. 2001/0045661 A1 (Yang et al.). The remainder of the Office action discusses the rejection in view of Lai et al. It is believed that the reference to the Yang et al. publication is in the nature of a typographical error, and that the rejection is based on Lai et al.

Claim 1, as amended, includes "depositing a metal liner layer comprising titanium nitride on a semiconductor device...; depositing, using physical vapor deposition, a seed layer of aluminum on the metal liner layer...; exposing the seed layer of aluminum to a reactive gas; and depositing, using a sputtering technique, aluminum on the seed layer...". Claim 1, as amended, finds support in the specification as filed. See, e.g., specification, p. 8, lines 8-9; p. 8, lines 6-7, p. 10, lines 6-9.

The Office action indicates, on page 3, that "Shan et al. discloses the claimed invention with the exception of exposing

the seed layer of aluminum to a reactive gas." The Office action indicates that Lai et al. teaches exposing a seed layer of aluminum to a reactive gas. Lai discusses a chemical vapor deposition process. For example, in Lai et al., a flow of gaseous aluminum metal organic precursor is started after a monolayer of a metal organic precursor has been deposited. Lai et al., col. 5, lines 26-31. "Preferably, the aluminum metal organic precursor is pumped into CVD chamber 10…" Lai et al., col. 5, lines 52-54. See also Lai et al. col. 3, lines 31-33 ("referring now to Fig. 1, a chemical vapor deposition (CVD) a system which can be used to perform the process of the present invention as depicted in schematic form.").

Thus, it appears that the reactive gas ascertained by the Examiner is a by-product of a chemical vapor deposition process, apparently by deposition of aluminum using a gaseous aluminum metal organic precursor. Claim 1, however, includes "...depositing, using physical vapor deposition, a seed layer of aluminum...; exposing the seed layer of aluminum to a reactive gas; and depositing, using a sputtering technique, aluminum on the seed layer..." Accordingly, claim 1, as amended, is believed patentable in view of Shan et al. and Lai et al. Claims 2, 3, 7, 9-20, which depend ultimately on claim 1, are also therefore believed allowable.

Claim 21, as amended, specifies "...applying a metal liner layer comprising titanium nitride to a surface and into an aperture of a semiconductor device; applying, using physical vapor deposition, a seed layer of aluminum onto the metal liner layer...; treating the seed layer of aluminum with a reactive gas; and depositing, using a sputtering technique, a layer of

aluminum onto the seed layer...". In view of the discussion above relating to Lai et al. it appears that claim 21 is patentable in view of Shan et al. and Lai et al. Claims 22, 23, 25, 26, and 28-39, which ultimately depend on claim 21, are also therefore believed allowable.

Claim 40, as amended, specifies "...depositing, using physical vapor deposition, a seed layer of cold aluminum on a metal liner layer comprising titanium nitride, exposing the seed layer to a reactive gas containing atmosphere, and depositing, using a sputtering technique, hot aluminum on the seed layer."

As discussed above, it appears that the reactive gas discerned by the Examiner is due to a chemical vapor deposition process, and absence of such in relevant part from claim 40 as amended would appear to make Lai et al. inapplicable to claim 40. In this regard, it is also noted that the aluminum in Lai et al. is deposited on the monolayer of the metalorganic adsorbed layer on the surface of refractory metal nitride of Lai et al. See Lai et al., col. 4, lines 52-53 and col. 5, lines 26-27.

Accordingly, it is believed that the application is now in condition for allowance, and allowance of same is respectfully requested.

Respectfully submitted,

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